CLAIMS

1/ A light path extending between first and second zones that are sealed relative to each other by a sealing gasket, said light path comprising at least one optical fiber and being characterized in that said optical fiber is provided with a metal coating and passes through said sealing gasket.

2/ The light path according to claim 1 characterized in that said sealing gasket adapted to withstand a difference between a first pressure in said first zone and a second pressure in said second zone.

3/ The light path according to claim 2, characterized in that said first pressure is substantially equal to atmospheric pressure and said second pressure is substantially equal to a pressure inside a production tube extending in a well passing through geological formations.

4/ The light path according to claim 2, characterized in that said difference between said first and second pressures is within a range of 0-40,000 psi.

5/ The light path according to claim 1, characterized in that said sealing gasket is mounted within a feedthrough (6).

6/ The light path according to claim 1, characterized in that said metal coating comes directly into contact with said sealing gasket (10).

7/ A light path according to claim 1, characterized in that the sealing gasket (10) is made of ceramic.

8/ The light path according to claim 7 characterized in that said ceramic is compacted around said metal coating.

9/ A light path according to claim 1, characterized in that said first zone (A) is situated inside an optical measurement tool and said second zone is situated outside said tool.

10/ A light path according to claim 9, characterized in that the second zone is situated inside a production tube extending in a well passing through geological formations, with a petroleum fluid flowing along said production tube.

11/ A light path according to claim 9, characterized in that the second zone is situated in the cemented annulus lying between the walls of a well passing through geological formations and casing of the well.

12/ The light path according to claim 1 characterized in that said at least one optical fiber has a first end, situated in the first zone, coupled to a light emitter and a second end, situated in the second zone, coupled to an optical measurement sensor (4).

13/ A light path according to claim 1, characterized in that said at least one optical fiber has a first end, situated in the first zone, coupled to a light receiver and a second end, situated in the second zone, coupled to an optical measurement sensor.

14/ The light path according to claims 12 characterized in that said optical fiber directly connects said emitter to said optical sensor.

15/ The light path according to claims 13 characterized in that said optical fiber directly connects said receiver to said optical sensor.

16/ A light path according to claim 12, characterized in that the second end of the optical fiber is coupled to said optical measurement sensor via an optical connector.

17/ A light path according to claim 13, characterized in that the second end of the optical fiber is coupled to said optical measurement sensor via an optical connector.

18/ The light path according to claim 14, characterized in that said metal coating extending between said emitter and said connector 7.

19/ The light path according to claim 15, characterized in that said metal coating extending between said receiver and said connector 7.

20/ A light path according to claim 1, characterized in that a portion of the optical fiber situated in the second zone surrounded by a protective tube that is permeable to said second zone.

21/ A light path according to claim 1, characterized in that said at least one optical fiber has a first end, situated in the first zone, coupled to an optical connector, said optical connector coupled to a light emitter and to a light receiver via secondary optical fibers, said at least one fiber having a second end, situated in the second zone, coupled to an optical measurement sensor.

22/ A light path according to claim 16, characterized in that the optical connector comprises a metal ferrule

having one end of the optical fiber stuck therein, said end being stripped of the metal coating.

23/ A light path according to claim 16, characterized in that inside the optical connector the ratio between the sections of the optical fibers is representative of the quantity of light conveyed in each optical fiber.

24/ The light path according to claim 1 characterized in that said at least one optical fiber includes first and second metal coated optical fibers passing through said sealing gasket, said first and second optical fibers having a first end, situated in first zone, coupled to a light emitter, and a light receiver, respectively, and second end, situated in said second zone, coupled to an optical measurement sensor.

25/ A measurement device for use in a well for hydrocarbons, gas, water, or the like, the device comprising light path extending between first and second zones that are sealed relative to each other by a sealing gasket, said light path comprising at least one optical fiber and being characterized in that said optical fiber is provided with a metal coating and passes through said sealing gasket.

26/ The measurement device according to claim 25 characterized in that said sealing gasket adapted to withstand a difference between a first pressure in said first zone and a second pressure in said second zone.

27/ The measurement device according to claim 26, characterized in that said first pressure is substantially equal to atmospheric pressure and said second pressure is substantially equal to a pressure inside a production tube extending in a well passing through geological formations.

28/ The measurement device according to claim 26, characterized in that said second pressure is within a range of 0-40,000 psi.

29/ The measurement device according to claim 25, characterized in that said sealing gasket is mounted within a feedthrough.

30/ The measurement device according to claim 25, characterized in that said metal coating comes directly into contact with said sealing gasket.

31/ A measurement device according to claim 25, characterized in that the sealing gasket is made of ceramic.

32/ The measurement device according to claim 31 characterized in that said ceramic is compacted around said metal coating.

33/ A measurement device according to claim 25, characterized in that said first zone is situated inside said measurement device and said second zone is situated outside said measurement device.

34/ A measurement device according to claim 33, characterized in that the second zone is situated inside a production tube extending in a well passing through geological formations, with a petroleum fluid flowing along said production tube.

35/ A measurement device according to claim 33, characterized in that the second zone is situated in the cemented annulus lying between the walls of a well, passing through geological formations, and casing of the well.

36/ The measurement device according to claim 25 characterized in that said at least one optical fiber has a first end, situated in the first zone, coupled to a light emitter and a second end, situated in the second zone, coupled to an optical measurement sensor.

37/ A measurement device according to claim 25, characterized in that said at least one optical fiber has a first end, situated in the first zone, coupled to a light receiver and a second end, situated in the second zone, coupled to an optical measurement sensor.

38/ A measurement device according to claim 36, characterized in that said optical fiber directly connects said emitter to said optical sensor.

39/ / A measurement device according to claim 37, characterized in that said optical fiber directly connects said receiver to said optical sensor.

40/ A measurement device according to claim 36 characterized in that the second end of the optical fiber is coupled to said optical measurement sensor via an optical connector.

41/ A measurement device according to claim 37 characterized in that the second end of the optical fiber is coupled to said optical measurement sensor via an optical connector.

42/ The light path according to claim 36, characterized in that said metal coating extending between said emitter and said optical connector.

43/ The light path according to claim 37, characterized in that said metal coating extending between said receiver and said optical connector.

44/ A measurement device according to claim 25, characterized in that a portion of the optical fiber situated in the second zone surrounded by a protective tube that is permeable to said second zone.

45/ A measurement device according to claim 25, characterized in that said at least one optical fiber has a first end coupled to an optical connector, said optical connector connecting said at least one optical fiber both to a light emitter and to a light receiver via secondary optical fibers.

48/ A measurement device according to claim 45, characterized in that the optical connector comprises a metal ferrule having one end of the optical fiber stuck therein, said end being stripped of the metal coating.

49/ A measurement device according to claim 45, characterized in that inside the optical connector the ratio between the sections of the optical fibers is representative of the quantity of light conveyed in each optical fiber.

50/ The measurement device according to claim 25 characterized in that said at least one optical fiber includes first and second metal coated optical fibers passing through said sealing gasket, said first and second optical fibers having a first end, situated in first zone, coupled to a light emitter, and a light receiver, respectively, and second end, situated in said second zone, coupled to an optical measurement sensor.